SOCIETIES AND ACADEMIES

LONDON

Geological Society, November 7.—Prof. P. Martin Duncan, F.R.S., president, in the chair.—Stephenson Clarke, William Hunter, and the Rev. W. Roberts, were elected Fellows of the Society. The following communications were read: A letter dated September 14 was read, from Lord Derby, stating that his lordship had received a despatch from her Majesty's Minister at Tehran, reporting that a mining engineer had arrived there from Berlin, who, at the request of the Persian government, had been selected by Messrs. Siemens to ascertain what foundation there was for the reported existence of a rich vein of gold in the vicinity of Zengan; that he had visited the locality and reported that auriferous quartz does exist, but that he had not yet succeeded in finding any vein or deposit of the metal.—Notes on fossil plants discovered in Grinnell Land by Capt. H. W. Feilden, Naturalist to the English North Polar Expedition, by Prof. Oswald Heer, F.M.G.S. Near Discovery Harbour, where H.M.S. *Discovery* wintered in 1875-6, in about 81° 45′ N. lat., and 64° 45′ W. long., a bed of lignite, from twenty-five to thirty feet thick, was found, resting unconformably upon the azoic schists of which Grinnell Land chiefly consists. The lignite was overlain by black shales and sandstones, the former containing many remains of plants; and above these there were, here and there, beds of fine mud and glacial drift, containing shells of marine mollusca of species now living in the adjacent sea. This glacial marine deposit occurs up to levels of 1,000 feet, indicating a depression and subsequent elevation of the region to at least this extent. Remains of twenty-five species of plants were collected by Capt. Feilden, and eighteen of these are known from miocene deposits of the Arctic zone. The deposit is therefore no doubt miocene. It has seventeen species in common with Spitzbergen (78° 79′ N. lat.), and eight species in common with Greenland (70° 71′ N. lat.). With the miocene flora of Europe it has six species in common; with that of America (Alaska and Canada) four; with that of Asia (Sachalin) four also. The species found include two species of *Equisetum*, ten Coniferæ, *Phragmites œningensis*, *Carex noursoakensis*, and eight dicotyledons, namely, *Populus arctica*, *Betula prisca*, and *Brongniarti*, *Corylus macquarrii* and *insignis*, *Ulmus borealis*, *Viburnum nordenskiöldi*, and *Nymphæa arctica*. Of the Conifers, *Torellia rigida*, previously known only by a few fragments from Spitzbergen, is very abundant, and its remains show it to have been allied to the Jurassic genera *Phœnicopsis* and *Bœera*, the former in its turn related to the carboniferous *Cordaites*, and among recent conifers, to *Podocarpus*. Other conifers are, *Thuites ehrenswärdi* (?), *Taxodium distichum miocenum* (with male flowers), *Pinus feildeniana* (a new species allied to *P. strobus*), *Pinus polaris*, *P. abies* (twigs covered with leaves), a species of *Tsuga Pinus dicksoniana*, Heer.), and a white spruce of the group of *Pinus grandis* and *cariocarpa*. *Pinus abies*, which occurs here and in Spitzbergen, did not exist in Europe in miocene times, but had its original home in the extreme north, and thence extended southwards; it is met with in the Norfolk forest-bed, and in the interglacial lignites of Switzerland. Its present northern limit is 69½° N., and it spreads over 25° of latitude. *Taxodium distichum*, on the contrary, spread in miocene times from Central Italy to 82° N. latitude, whilst at present it is confined to a small area. *Betula brongniarti*, Ett., is the only European species from Grinnell Land not previously known from the arctic zone. The thick lignite bed of Grinnell Land indicates a large peat-moss, probably containing a lake in which the water-lilies grew; on its muddy shores stood the large reeds and sedges, the birches, poplars, *Taxodia*, and *Torellia*. The drier spots and neighbouring chains of hills were probably occupied by the pines and firs, associated with elms and hazel bushes. A single elytron of a beetle (*Carabites feildenianus*) is at present the sole evidence of the existence of animals in this forest region. The nature of the flora revealed by Capt. Feilden's discoveries seems to confirm and extend earlier results. It approaches much more closely to that of Spitzbergen than to that of Greenland, as might be expected from the relative positions of the localities; and the difference is the same in kind as that already indicated by Prof. Heer between Spitzbergen and Greenland, and would indicate the same kind of climatic difference. Nevertheless, the presence of *Taxodium distichum* excludes arctic conditions, and that of the water-lily indicates the existence of fresh-water, which must have remained open a great part of the year. Representatives of plants now living exclusively in the arctic zone are wanting in the Grinnell Land deposits; but, on the other hand, most of the genera still extend into that zone, although they range in Grinnell Land from 12° to 15° further north than at present.—On our present knowledge of the invertebrate fauna of the lower carboniferous or calciferous sandstone series of the Edinburgh neighbourhood, especially of that division known as the Wardie Shales, and on the first appearance of certain species in the beds, by Mr. R. Etheridge, jun., F.G.S.

Zoological Society, November 20.—Prof. Flower, F.R.S., vice-president, in the chair.—Mr. Howard Saunders exhibited a specimen of the rare Aleutian Tern (*Sterna aleutica*) from Alaska, and made remarks upon its intermediate position between typical *Sterna* and the group of the Sooty Terns (*Onychoprion*).—A communication was read from the Marquis of Tweeddale, F.R.S., containing an account of a collection of birds made by Mr. A. H. Everett in the Island of Zebu, Philippines. Six new species were found in this collection, and were named *Oriolus assimilis*, *Phyllornis flavipennis*, *Zosterops everetti*, *Prionochilus quadricolor*, *Turnix nigrescens*, and *Megapodius pusillus*.—Three communications were read from Dr. O. Finsch, C.M.Z.S. The first contained a report on a collection of birds made at Eua, Friendly Islands, by Mr. F. Hübner, which had increased our knowledge of the avifauna of Eua from four to twenty-four species. The second contained a description of a collection of birds made on the Island of Ponapé, Eastern Carolinas, by Mr. J. Kubary. The total number of species known at present from Ponapé was stated to be twenty-nine, of which seven were peculiar to the island. The third contained a list of the birds obtained at Ninafou Island in the Pacific, by Mr. F. Hübner. This collection raised the number of the known birds of this island from one to twenty.—Prof. Garrod, F.R.S., read notes on the *Taenia* of the rhinoceros of the Sunderbunds *Plagiotaenia gigantea*), on the anatomy of the Chinese water-deer (*Hydropates inermis*), on the possible cause of death in a young seal, and on the occurrence of a gall-bladder in certain species of parrots.—Mr. Howard Saunders, F.Z.S., read a paper on the *Laridæ* collected during the voyage of H.M.S. *Challenger*, which comprised nine species of *Sternæ*, five of *Larinæ*, and three of *Stercorarinæ*, altogether seventeen species represented by forty-given specimens; several of these were very rare in museums, although none of them were absolutely new to science.—A communication was read from Dr. A. B. Meyer, containing some additional proofs of the fact that the Red *Eclecti* are the females of the green species of that genus.—A paper was read by Mr. G. French Angas, C.M.Z.S., containing notes on *Helix sepulcharalis* of Ferrusac, and its allies, with descriptions of two new species.

Physical Society, November 17.—Dr. Stone, vice-president, in the chair.—The president, Prof. G. C. Foster, described and exhibited a very simple form of absolute electrometer, which acts on the same principle as Sir W. Thomson's trapdoor form of apparatus, but can be constructed at a very moderate cost. To one arm of a balance is suspended by silk fibres a zinc disc, which hangs horizontally in the plane of a sheet of the same metal forming a guard-plate; and at a distance of about one inch below is a flat sheet of zinc, also horizontal. An electrical connection is formed between the guard-plate and suspended disc by a bridge of very fine wire. The method of using the apparatus to determine the potential required for a spark to pass from a Holtz machine through varying thicknesses of air was explained. When the balance has been accurately counterpoised, an excess weight, say one gramme, is introduced into the scale pan, and the guard-plate and the lower attracting-plate, as well as the two knobs of a spark-measurer, are connected with the conductors of the machine. If this be now set in action, and the knobs of the spark-measurer be gradually separated, a point will be reached at which the attraction upon the suspended disc just overcomes the excess weight in the balance pan. The length of spark for which this occurs can now be read off. The difference of potential causing the spark is given by the formula $\frac{e}{a}\sqrt{8F}$, where a is the radius of the attracted disc, e its distance from the attracting-plate, and F the force of attraction in dynes. In the apparatus exhibited, a had the value 5·195 cm., and e the value 2·4 cm., whence, if w be the excess weight in grammes—so that $F = 981\,w$—the difference of potential becomes $39\sqrt{w}$. The proper action of the apparatus depends essentially upon the attracted disc being accurately in the same plane with the guard-plate. To facilitate this adjustment, each of the silk fibres by which the disc is suspended is attached to a

screw, by which it can be separately raised or lowered; and by means of another screw the small brass plate holding the suspending screws can be raised or lowered as a whole. A few numerical results were given to illustrate the action of the apparatus. These were taken from a set of experiments in which the difference of potential needed to produce sparks in air between two equal brass spheres of 2·61 cm. radius was measured. The following are the results for a few of the shortest and longest sparks measured :—

Length of Spark.	Difference of Potential.	Mean Electrical Force.
cm.		
0·1325	17·4	131
0·1825	20·4	117
0·237	24·6	104
0·68	62·9	93
0·71	65·2	92
0·74	68·7	93

VIENNA

Imperial Academy of Sciences, October 11.—Preliminary note on the position of the optical axes of elasticity in gypsum for various colours, by M. Lang. The angle of the optic axes shows a maximum for the Fraunhofer line D. The dispersion of the axes of elasticity in the plane of symmetry is abnormal. These observations agree on the one hand with Poggendorff's exact description of the axial forms of gypsum, and on the other side with Descloizeaux's observation that at the higher temperatures, where the plane of axis is at right-angles to the place of symmetry, no horizontal dispersion is observable.—Annual periods of the insect fauna of Austro-Hungary, by M. Fritsch.—On the relation between the second principal proposition of the mechanical theory of heat and the calculation of probability respecting the propositions on heat-equilibrium, by M. Boltzmann.—The cyliudroid and its specialties, by M. Kozak.—Simple calculation of elliptic arches, by G. Seewald.—On eruptive sands, and on the Flysch and the *Argille scagliose*, by M. Fuchs.—On equal figures in curves, cones, and surfaces of the second order and of certain of higher orders, by M. Puchta.—Calculation of cylindrical vessels with complicated relations, by M. Streicher.—On development of the resinous passages in some coniferæ, by M. Weiss.—Continued studies on the mode of ending of nerves of smell, by M. Exnor.

PARIS

Academy of Sciences, November 26.—M. Peligot in the chair :—The following papers were read :—Geographical positions of the principal points of the coast of Tunis and Tripoli, by M. Mouchez. This relates to observations during the hydrographic voyage of the *Castor* in 1876, of some fifty points equally distributed along about 300 leagues of coast.—On some applications of elliptic functions (continued), by M. Hermite.—The Echidna of New Guinea, by M. Gervais. He notes several points in which the head differs from that of the Australian animal.—On invariants, by Prof. Sylvester.—On the waves of various kinds which result from the working of the sluice of Aubois, by M. Caligny.—On the solution of the equation of the fifth degree, by M. Brioschi.—Nature of the hydrocarbons produced by action of acids on manganesiferous spiegeleisen, by M. Cloez. Several of these products seem identical with those which exist in the ground and are extracted on a large scale under the name of petroleum. This production of complex carbonised compounds, without any intervention of life, supports the views of certain geologists on the origin of petroleum. The reproduction of a large number of organic species might be realised by commencing with ethylenic or formenic hydrocarbons, furnished by cast iron.—Discovery and observation of the planet 175 by Mr. Watson.—On the distances of stars, by M. Flammarion. He cites several facts which seem not to allow of basing on differences of brightness an estimate of distances.—On the intermediary integral of the third order of the equation with partial derivatives of the fourth order expressing that the problem of geodesic lines supposes an algebraic integral of the fourth degree by M. Levy.—Graphic tables and anamorphic geometry; reclamation of priority, by M. Lalanne.—Second note on the magnetisation of steel tubes, by M. Gaugain. The variations of magnetism produced by heat in a solid bar of steel are not different from those in a system composed of a tube and a core. Both seem to depend on the *inverse* magnetism developed by the mutual reaction of concentric layers, whether of the bar or of the system.—Liquefaction of bioxide of nitrogen, by M. Cailletet. This he effected by compressing to 104 atmospheres at − 11°. At + 8° the bioxide is still gaseous under 270 atmospheres. He hopes, also, to be able to liquefy formene. M. Berthelot remarked on the importance of this achievement, and thought it probable that most of the gases not yet liquefied, such as oxygen, which already diverges from Mariotte's law under great pressures, and oxide of carbon, would yield to M. Cailletet's new processes.—On nitrification by organic ferments, by MM. Schloesing and Muntz. Whenever, in these experiments, a nitrifiable medium has remained in the presence of chloroform, or has been heated to 100°, then guarded from dust, the nitrification has been suspended, but it has been possible to renew it, by introducing into the heated medium a minimum quantity of a substance like mould in process of nitrification.—On the termination of the nerves in tactile corpuscles, by M. Ranvier. He studied these organs in the tongue and bill of the domestic duck (where they are found in great simplicity). The tactile disc, the true sensitive nervous organ, is protected against mechanical excitations from without by the special cells surrounding it. It can only be impressed in an indirect way.—An experiment in *stasimetry* or measurement of the consistence of organs, by M. Bitot. The instrument is a kind of balance having at the end of one arm a perforating or sounding needle, at the end of the other a small controlling plate, and at the centre a pendulum with successive weights and a long indicator needle connected to it above, moving over a graduated scale.—On a modification of Bell's telephone, with multiple membranes, by M. Trouvé. A cubical chamber is substituted for the single membrane; each face of it is a membrane which, in vibrating, influences a fixed magnet with electric circuit. Associating all the currents generated, an intensity is obtained proportional to the number of magnets affected.—On the telephone, by M. Pollard. This describes some experiments at Cherbourg. M. Du Moncel called attention to the ideas expressed by M. Ch. B—— more than twenty years ago, and which contains the telephone in germ.—On a new sounding apparatus for works of coast hydrography, by M. Pinheiro.

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